Some Sex Associations in the Brachycistidinae

(Hymenoptera : Tiphiidae)

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The phenomenon of sexual dimorphism is evident to a greater or lesser degree in nearly all groups of non-parthenogenetic animals, but nowhere is it so strikingly obvious as in certain groups of aculeate Hymenoptera. Thus in the Mutillidae, Tiphiidae, and some Bethylidae, the sexes differ to such an extent that each presents a greatly different array of traits. From a theoretical point of view, this could be of advantage, providing the systematist with a greater number of characters with which to define the taxa in a heirarchy. In practice, however, the difficulties encountered in dealing with a duality of phenotypes more than offsets any advantages inherent in such a system. Keys and descriptions must be lengthened or separate keys presented to accommodate the two sexes. The difficulty in associating the sexes rests on several interdependent factors: first, the degree of dimorphism; second, the state of knowledge of the biology of the organism; and third, the distribution, both geographic and seasonal.

In the tiphiid subfamily Brachycistidinae, sexual dimorphism is as pronounced as in almost any group of terrestrial animals, and indeed, at the present state of the knowledge of the group, no morphological traits except size have been found that could be used to correlate the sexes. The biology of the subfamily remains a mystery, although I speculated that the host might be larvae of the Scarabaeidae (Wasbauer, 1966). Females are rare and the few opportunities I have had to attempt to induce oviposition on possible hosts have resulted in failure. Correlation by coincident geographical distribution is normally a perilous means and depends on location of an area with a depauperate fauna. Fortunately, such an area exists in the Channel Islands off the coast of Santa Barbara County, California. Three of the islands, Santa Cruz, Santa Rosa and San Miguel form an east-west chain varying from about fifteen to twenty-eight miles from nearest land. Repeated collecting efforts over the past thirty years have yielded a single species of brachycistidine male, *Brachycistis agama* (Dalla Torre), from these three islands. Recently, I received a collection of Brachycistidinae from the Los Angeles County Museum. In this material there was a female, collected on San Miguel Island, Santa Barbara County, California, 29 July 1939 by Lloyd M. Martin. Examination of this specimen shows it to be *Glyptometopa francisca* Mickel and Krombein. A specimen

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of *Brachycistis agama* from the same collection bears identical collection data. The presumptive evidence in this case seems sufficient therefore to warrant placing *Glyptometopa* in synonymy with *Brachycistis*.

Another site which has been collected intensively for nocturnal Hymenoptera is the sand dunes near Antioch, Contra Costa County, California. Four species of *Brachycistis* have been taken there: *B. inaequalis* Fox, *B. agama* (D.T.), *B. petiolata* Fox, and *B. imitans* Malloch. Of these, only *B. imitans* and *B. agama* are commonly taken. *B. petiolata* and *B. inaequalis* are known from the area by a single record each. I have seen nine female specimens in the collections of the U. S. National Museum and California Insect Survey from the Antioch dunes, all of which I consider conspecific and belonging to an undescribed species of *Stilbopogon* Mickel and Krombein. Since *Glyptometopa* is associated with *Brachycistis agama* (*agama* group), it seems certain that the Antioch *Stilbopogon* represents the female of *Brachycistis imitans* (*petiolata* group).

The type species of *Stilbopogon* is *S. alutacea* Mickel and Krombein, described from Deming, New Mexico. Examination of the distribution patterns of species in the *Brachycistis petiolata* group shows that *Brachycistis elegantula* Cockerell and Casad is the only one which occurs in the area occupied by *Stilbopogon alutacea*. It could be logically concluded, then, that *Stilbopogon alutacea* is the female of *Brachycistis elegantula*. There is another species, however, *Brachycistis indiscreta* Fox which occurs in the same area, and is in the same size range as *B. elegantula*. In addition, although the preponderance of characters place it in the *agama* group, *B. indiscreta* does show some affinities with the *petiolata* group. For these reasons, the name *S. alutacea* Mickel and Krombein should be retained until such time as there is a definite sex correlation with one or the other of the males mentioned above.

In summary, the following nomenclatorial action is proposed:

Brachycistis Fox
  Glyptometopa Ashmead (new synonymy)
  Stilbopogon Mickel and Krombein (new synonymy)
Brachycistis agama (Dalla Torre)
  Glyptometopa francisca Mickel and Krombein (new synonymy).

I have selected a plesiotype from the Antioch, California series of females here associated with *Brachycistis imitans* and have provided a description of it as follows:

Brachycistis imitans Malloch

Plesiallotype female.—Shining, light medium brown, sparsely punctate,

punctures shallow, scattered, nearly absent on head and dorsum of thorax, large, shallow, first degree density on proepisternum; mesonotum with irregular longitudinal row laterally; first degree density on dorsolateral angles of pronotum, mesonotum and propodeum, posterodorsal, posterolateral angles of propodeum and expanded portion of mesepisternum, each pucture giving rise to a long straight straw colored hair; first metasomal tergum irregularly closely punctate, succeeding metasomal terga nearly impunctate except for irregular, curved row laterally.

Head.—Subquadrate, broader than long, width at widest point (just above compound eyes) 1.15 the length (measured from vertex to apex of clypeus); vertexal impressions short, linear, diverging posteriorly, each giving rise to several stout hairs; compound eye removed from level of posterior margin of vertex by less than twice its length; setose genovertical sulcus attaining level of posterior margin of compound eye; mandiblcs slender, bidentate, wider at level of inner tooth than at base, antenna somewhat flattened, scape densely setose beneath for its entire length, with dense tuft of posteriorly directed hairs at apex dorsally, the longest hairs of which are longer than the scape; first four antennal segments in a ratio of 3.0 : 1.0 : 1.0 : 1.2; clypeus greatly reduced, visible only as narrow trapezoid extending between centers of antennal sockets; underside of head shining with sparse but noticeable punctures, each puncture giving rise to a long, slender hair. Maxillary cardo with a group of long slender hairs; maxillary palpi six segmented; labial palpi four segmented; gular orifice relatively short, rounded posteriorly, 0.3 as wide as head at level of mandibular insertions.

Mesosoma.—Width ratios of thoracic nota: pronotum 1.00; mesonotum 1.11; propodeum 0.86; propodeum trapezoidal, 0.68 as wide at base as at apex; prothoracic leg short, tibia without spines on anterior surface, posterior surface with pair of closely set, spatulate spines apically and a longer, more slender spine ventrad of thesc; basitarsus ventrally with two spines directed posteroventrally, basal spine twice length of apical spine, anteriorly with four comb spines, successively increasing in length, apex with single long, flattened spine, nearly as long as basitarsus, second and third tarsal segments with long, flattened lateroapical and apical comb spine, penultimate segment with short, sharp apical spine; mesotibia with five ill-defined spine rows on anterior surface, spines short, flat, those of dorsal row somewhat spatulate, metatibia with three ill-defined spine rows on anterior surface, spines longest at apex.

Metasoma.—First metasomal segment without distinct petiole; pygidium gently convex without sulci or ridges.

Length.—5.0 mm.

The *plesiallotype* bears the following data: "ANTIOCH, CONTRA COSTA COUNTY, CALIFORNIA. VIII-19-1952. R. Schuster Collector." With the kind permission of Dr. J. A. Powell (California Insect Survey) it has been deposited on indefinite loan at the California Academy of Sciences.

LITERATURE CITED

WASBAUER, M. S. 1966. Revision of the male wasps of the genus *Brachycistis* in America North of Mexico. Univ. Calif. Publ. Entomol., 43: 1–96.